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## THE RELATION OF ELECTRICITY TO AGRICULTURE

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March 6, 1946

"Pittsburgh Plus" has long been recognized as the practical factor which has meant profitable steel production west and south of Pennsylvania. It simply means that all steel produced and sold any place outside of Pittsburgh carries an additional sale charge equal to the cost of shipping to the point of destination from Pittsburgh.

"Electricity Plus" is rapidly becoming the economic factor that is bringing additional profits to the farm. Electricity plus good management practices, proper methods, and good technique are a combination that can and will get the results on the farm which have been obtained in many of our experiment stations. With approximately 50 percent of our farms electrified it is now possible to extend experiment station methods, excellence of control, and uniform results to the individual farm, on a scale never before possible. Electricity will bring the climax and fulfillment of scientific agriculture largely because it eliminates much hand labor, it takes the guess work out of controlled conditions and makes easy the application of heat, cold, power, and light in obtaining desired results.

Since the beginning of established agriculture there has been a constant search for methods of eliminating as much hand labor as possible. This search resulted in harnessing the ox and the horse. Field tillage equipment has been powered by animals from earliest history to the present day. About 1830 animal power was first successfully applied to seeding, harvesting and threshing machinery. These applications were largely responsible for the rapid mechanization of agriculture that has occurred since the reaper was invented. Wind and water power have also been applied for centuries in pumping water and grinding flour and feed. But these two sources were so limited in application that they constituted only a small portion of the total power needed and used in agriculture. The invention of the steam engine offered agriculture the first portable mechanical power. Before steam could be widely applied the internal combustion engine was developed and the two were immediately in direct competition. Steam power was quickly eliminated on the farm because of the gas engine's increased portability due to lighter construction and easily supplied fuel. Internal combustion engine power was so versatile that it also rapidly replaced animal power. In 1920 the horse and mule population of the United States was approximately 20,000,000 animals. In 1940 their number dropped to less than 12,000,000. This decrease was almost entirely due to the use of trucks and tractors in place of draft animals.

As the tractors improved and their adaptability increased they were used more and more for all types of farm work and power needs. The extension program of 1915 to 1920 advocating the use of a tractor

for at least 1,000 hours per year, to justify its purchase, did much to promote the development of belt driven machinery. Such equipment is designed to consume the tractor's power to assure economic operation of the motor. Most tractors in turn are selected to supply the power necessary to get the spring plowing done on time. Since this is generally the heaviest work to be done on the farm, the tractor has more power than is required to do most other farm work. Consequently machines designed to fit the tractor are generally larger than would be required to do their particular job on most farms. This is especially true of crop processing machinery. Obviously the tractor or gas engine is a major source of power and it is good business to operate it efficiently when it is in use. That sales program has placed much oversized machinery and equipment on many farms. The program was economically sound for a period of twenty to thirty years, when tractors were the only major power available. It has resulted in educating the farmer to use large capacity machines, demanding a peak labor supply, and a minimum of time for any one task. It has also resulted in a large investment in equipment, the employment of temporary extra labor for threshing, feed grinding and silo filling and similar power work. The net result may be said to have caused uneconomic investment in machinery and excessive expenditures for labor in relation to the amount of belt power work to be done on many farms.

Rural electrification constitutes a modern revolution in the application of power to agriculture and in the selection of equipment necessary to do required work. Because of its flexibility and accurate control, smaller units operating on a semi or fully automatic basis can be made to reduce labor demands to a minimum. The overall efficiency of small machines, working long periods with minimum manual attention is not only much greater but the investment in equipment is also greatly reduced. Proper application of electric power can and will reduce seasonal labor demands for crop processing and in the time spent in every day chore work.

Motors may readily be substituted for muscles in most daily tasks. The one-quarter horse power electric motor will do the work requiring one to three or more men at various types of tasks such as the pumping of water, driving a one-hole corn sheller, turning a cream separator, a grindstone, a churn, a food chopper, and many other tools and tasks. In addition, a great variety of tasks and operations can be done by electric power which, without it would be difficult to accomplish or impractical to attempt. Heat applications are particularly easy to use. These include brooders for chickens and young animals such as sheep, pigs, and calves, heating the soil in hot beds, soil sterilizing, for weed and insect control, water heating using internal, external, or immersion type heating units or elements.

Home subsistence opportunities and methods are greatly extended and improved when electric power is available. For the first time many families will be able to preserve high quality food for home consumption that will be of equal or better quality than that displayed on the local grocers' shelves. Home canning, quick freezing and dehydration of fruits and berries are fields especially promising in the use of electric power. Thermostatic heat and cold control take the guess work out of kitchen processing.

The production of many kinds of farm produce can be greatly increased, and the quality improved by the use of electric power. Special fields include garden watering to maintain production through dry periods. Insect and weed control applications are readily made. These include light traps, electric screens, and soil sterilizing equipment all readily adaptable to farm conditions.

In the refrigeration field quick freezing chests, walk-in refrigerators of large capacity, cold storage rooms for perishable products usually marketed seasonally and milk coolers greatly extend refrigeration benefits beyond the kitchen. All of those and many more applications may be used in helping to solve the problems which have always confronted agriculture. Without electricity many of these applications could not be developed at all, while in other cases the cost or difficulty of establishing them made their use impractical. The farmer who can incorporate the many possibilities of using electric power into his farm business is definitely on the road to increased income, a higher standard of living and reduced labor requirements.

In closing it may be said that these applications must be planned over a period of years, as much in advance as possible, if the change-over to electric power is to be made to the greatest advantage and at a minimum of expense.





